

Advanced Practice Nurse–Led Transitional Care Bundles and Early Post-Discharge Outcomes in Complex Chronic Patients: A Quasi-Experimental Evaluation

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ABSTRACT: Transitions from hospital to home are a critical period for patients with complex chronic conditions, often marked by fragmented care, poor coordination, and preventable acute-care utilization. Advanced practice nurses (APNs) are increasingly positioned to address these gaps through structured transitional care. This study evaluated the impact of an APN-led Transitional Care Bundle on early post-discharge outcomes among complex chronic patients. A quasi-experimental evaluation was conducted among adults with complex chronic conditions—including heart failure, COPD, and diabetes—discharged from hospital to home. The intervention comprised a structured Transitional Care Bundle coordinated by APNs, incorporating mandatory components (individualized education, medication reconciliation, service access facilitation, and early post-discharge follow-up) and optional components based on patient need. Outcomes were compared with usual care using electronic health records, program logs, and patient surveys. Patients receiving the APN-led bundle experienced significantly lower 30-day readmissions and emergency department visits, higher completion of discharge medication reconciliation, and substantially improved seven-day follow-up rates. Patient-reported transition quality (CTM-15) was significantly higher, reflecting improved preparedness and self-management support. These findings support APNs as coordinators of standardized transitional care bundles, with future research needed on long-term outcomes, cost implications, and scalability.

Keywords: Transitional Care, Advanced Practice Nurse, Hospital Discharge, Care Coordination, Readmission, Patient-Reported Outcomes.



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INTRODUCTION

Transitions from hospital to home represent one of the most vulnerable phases in the care trajectory of patients with chronic and complex conditions. Older adults living with heart failure, chronic obstructive pulmonary disease, diabetes mellitus, and multimorbidity frequently experience fragmented care during this period, exposing them to heightened risks of clinical

deterioration, medication-related harm, and unplanned health service utilization. Across health systems, hospital readmissions and emergency department visits within 30 days of discharge remain persistent quality and safety concerns, reflecting not only disease severity but also systemic weaknesses in how care is coordinated across institutional and community boundaries. As populations age and the prevalence of chronic disease increases, strengthening transitional care has become a critical priority for ensuring continuity, safety, and efficiency of healthcare delivery.

A substantial body of literature identifies suboptimal transitional care as a central driver of avoidable readmissions among patients with chronic illnesses. Failures in coordination and communication between hospital teams and community-based services repeatedly emerge as proximal causes of post-discharge instability, increasing the likelihood of adverse events and rehospitalization (Powers et al., 2021; Smith & Treschuk, 2018). Discontinuities across care settings such as transitions from hospital to home care, primary care, or municipal services often result in unclear accountability, incomplete information transfer, and role ambiguity, creating conditions in which early warning signs are missed and patient needs remain unmet (Dolu et al., 2020; Shin et al., 2020). Transitional care has therefore been conceptualized as a deliberate set of actions designed to ensure continuity across settings; when these actions are absent or inconsistently implemented, readmission risk predictably rises (Nasrabadi et al., 2021).

In addition to coordination failures, insufficient discharge preparation constitutes a second major contributor to poor post-discharge outcomes. Inadequate patient and caregiver education, incomplete discharge planning, and the absence of structured guidance for self-management at home have been widely documented in studies of chronic noncommunicable diseases and older populations (Barbosa et al., 2023; Costa et al., 2020). Nursing-focused research emphasizes that when follow-up instructions, symptom monitoring guidance, and coordination with receiving services are weak, continuity of care is compromised and post-discharge instability becomes more likely (Guzmán et al., 2020; Rustad et al., 2017). Beyond clinical preparation, social and logistical barriers such as limited access to services, caregiving constraints, and socioeconomic vulnerability are increasingly recognized as critical determinants of readmission risk, reinforcing the need for transitional care models that address both clinical and nonclinical drivers (Boutwell et al., 2016; Ziebarth et al., 2023).

Condition-specific evidence further illustrates the vulnerability of the post-discharge period for chronic illness populations. In heart failure, rehospitalization has been consistently linked to gaps in discharge readiness, symptom monitoring, medication management, and early follow-up support, all of which are explicitly targeted by heart failure transitional care programs and integrative reviews (Akomah et al., 2020; Suksatan & Tankumpuan, 2021). Similarly, for chronic obstructive pulmonary disease, qualitative and quasi-experimental studies associate high acute-care utilization with challenges at discharge and weak hospital–community integration, including contextual and cultural barriers that undermine continuity and precipitate post-discharge deterioration (Jehloh et al., 2024). For diabetes mellitus, while disease-specific readmission mechanisms are less consistently isolated, evidence from broader chronic care literature indicates that shared failures in discharge planning, education, and coordination remain central contributors to preventable utilization (Powers et al., 2021).

Against this backdrop, transitional care interventions have been developed to improve outcomes for older adults with multiple chronic conditions. Syntheses of the literature indicate that transitional care interventions particularly those incorporating elements of the Transitional Care Model are associated with improvements in readmission-related outcomes and patient-centered measures, although effect sizes and consistency vary by intervention design and context (Berthelsen et al., 2023; Jackson et al., 2016). Systematic reviews and meta-analyses of nurse-coordinated transitional interventions for frail older adults suggest benefits across multiple outcomes, including readmissions, functional status, and quality of life, while also highlighting heterogeneity in how coordination is operationalized (Parker et al., 2024). Program-level evaluations further demonstrate that transitional care can stabilize patients during vulnerable periods, improve functional independence, and reduce downstream deterioration, even as questions remain regarding which specific components are essential versus context-dependent (Robert et al., 2024).

Within these interventions, advanced practice nurses play a central role in sustaining continuity of care across settings. Evidence from integrative reviews of nurse practitioner–led transitional care supports APNs as effective leaders of discharge coordination and post-discharge follow-up for chronically ill older adults (Mora et al., 2017). Specialized transitional clinics and follow-up models staffed by nurse practitioners are explicitly designed to address the vulnerability of the hospital-to-home period, demonstrating how advanced nursing roles can operationalize continuity through timely assessment, medication management, and coordination with community services (Michaelis et al., 2023).

Broader nursing role conceptualizations, such as nurse navigator models and specialist rehabilitation nursing perspectives, similarly emphasize advanced nursing competencies in guiding patients across complex care pathways, preparing patients and caregivers, and linking services beyond discharge (Ferreira et al., 2024; McMurray & Cooper, 2017). These roles align with qualitative evidence attributing continuity after discharge to nursing practices that integrate coordination, education, and intersectoral linkage (Dolu et al., 2020). Collectively, this literature positions APNs as uniquely equipped to lead structured transitional care processes that address fragmentation inherent in multi-provider chronic care.

Global policy and consensus recommendations further reinforce the need for nurse-led transitional care. International organizations have highlighted inadequate care transitions as a systemic problem and have called for reorganization of care models to improve continuity across settings (Pedrosa et al., 2022). In the United States, national coalitions advocate reframing discharge as an ongoing transfer with continuous management rather than a discrete endpoint, implicitly elevating the role of coordinated transitional management often led by nursing teams (Powers et al., 2021). Consensus-based best-practice recommendations for transitions across post-acute and community settings similarly emphasize structured processes, accountability, and communication elements closely aligned with nurse-led coordination roles (Lindquist et al., 2016).

Despite these advances, important gaps persist in current transitional care models for complex chronic patients. Implementation gaps remain pronounced, with effective interventions inconsistently adopted in routine practice due to organizational silos, resource constraints, and

system misalignment (Prusaczyk et al., 2020; Costa et al., 2020; Powers et al., 2021). Certain high-complexity populations, including older adults with cognitive impairment and those transitioning through skilled nursing facilities, are underrepresented in transitional care research and lack tailored intervention models (Jones et al., 2017; Toles et al., 2016). Additionally, measurement inconsistency in assessing transitional care quality complicates comparison across studies and limits the ability to standardize and scale effective models (Malley & Kenner, 2016).

In response to these gaps, structured, bundle-based transitional care interventions have been proposed as a means of reducing fragmentation through standardization, clear role definition, and consistent delivery of core transitional actions. Evidence from structured discharge tools, communication checklists, and caregiver guidance instruments suggests that bundling key transitional elements can improve information transfer, preparation, and continuity (Allen et al., 2020). However, further empirical evaluation is needed to determine the effectiveness of such bundles when coordinated by advanced practice nurses in real-world hospital-to-home transitions for complex chronic populations.

Accordingly, the objective of this study is to evaluate the impact of an advanced nurse–led Transitional Care Bundle on post-discharge outcomes among patients with complex chronic conditions. By examining hospital readmissions, emergency department utilization, and patient-reported quality of care transitions, this study aims to contribute empirical evidence on whether structured, nurse-led transitional bundles can address persistent fragmentation and improve continuity of care during one of the most vulnerable periods in the chronic care trajectory.

METHOD

Study Design and Rationale

This study employs a quasi-experimental evaluation design to examine the association between an advanced practice nurse (APN)-led Transitional Care Bundle and post-discharge outcomes among complex chronic patients transitioning from hospital to home. Quasi-experimental designs are indicated when random assignment is infeasible or undesirable in real-world healthcare delivery, especially for patient-safety and service interventions where withholding or delaying implementation may be impractical (Schweizer et al., 2016; Tugwell et al., 2017). The chosen design is justified by the implementation context, the intervention rollout mechanism, and the feasibility constraints of routine discharge operations. Consistent with established quasi-experimental families, the evaluation can be operationalized as a controlled before–after design or as an interrupted time series (ITS) when adequate time-indexed data are available (Schweizer et al., 2016; Tugwell et al., 2017). In transitional and integrated care research, quasi-experimental programmes are commonly used to study quality and safety improvements in complex multi-actor settings where randomization is difficult to implement (Storm & Aase, 2016).

Setting and Population

The study is conducted in a hospital-to-home transition context. The target population comprises adult patients with complex chronic conditions who are discharged from inpatient care to the community. Clinical eligibility focuses on patients with diagnoses that are frequently associated with transitional vulnerability and unplanned utilization, including heart failure (HF), chronic obstructive pulmonary disease (COPD), and diabetes mellitus (DM). In addition to diagnosis-based eligibility, complexity criteria may include older age, multimorbidity, high treatment burden, and prior frequent admissions. These criteria align with transitional care literature emphasizing that discontinuities, insufficient discharge preparation, and inadequate follow-up contribute to preventable returns to acute care among chronically ill populations (Rustad et al., 2017).

Intervention: Advanced Nurse–Led Transitional Care Bundle

The intervention is a structured Transitional Care Bundle coordinated by APNs as single points of contact for complex discharges. Bundling is defined as the packaging of essential transitional actions into a repeatable, auditable process aimed at reducing fragmentation and variability in discharge practices (Allen et al., 2022). The intervention begins during the inpatient stay and extends into the early post-discharge period. Core (mandatory) elements include: (i) individualized patient and caregiver education, (ii) medication reconciliation at discharge, (iii) facilitation of access to services and referrals, and (iv) post-discharge follow-up within a defined early window (e.g., within 7 days). Optional, context-dependent elements may include home visits, telemonitoring, and a patient hotline, depending on resource availability and patient need.

APNs operationalize the bundle through coordination and boundary-spanning activities that address known transitional failure points, particularly communication gaps and unclear accountability between hospital and community services (Gautun et al., 2020). The APN role is aligned with evidence supporting nurse practitioner–led transitional care processes and advanced nursing contributions to continuity, including patient preparation, cross-setting coordination, and linkage to community resources (Mora et al., 2017). To support implementation fidelity, each bundle element is operationally defined and recorded using standardized templates and logs.

Comparator (Usual Care)

The comparison condition is standard discharge care delivered before bundle implementation (pre-intervention period) and/or in contemporaneous control units or facilities not implementing the bundle (controlled before–after). Usual care typically includes routine discharge documentation and variable education and follow-up practices without a standardized APN-led coordination structure. The comparator is specified to enable estimation of the intervention’s incremental association with outcomes and to provide a credible counterfactual.

Outcomes and Measures

To align with best practices for quasi-experimental evaluation, the study pre-specifies a limited set of primary and secondary outcomes that map to transitional care theory and stakeholder priorities, while also minimizing measurement heterogeneity ((Yoshimura & Sumi, 2022). Outcomes are measured over a defined follow-up window (30 days) to capture early post-discharge vulnerability.

Primary Outcomes

1. 30-day readmission (Readmission_30d): A binary indicator reflecting whether the patient experienced an inpatient readmission within 30 days of index discharge.
2. 30-day emergency department use (ED_30d): A binary indicator reflecting an emergency department visit within 30 days of discharge.
3. Transition quality (CTM-15 score / CTM15_score): A continuous patient-reported measure (0–100) assessing perceived quality of care transition.

Secondary Outcomes (Process and Mechanism Measures)

Consistent with transitional care theory and recommendations to include implementation/process measures, the evaluation includes standardized indicators reflecting delivery of bundle components and hypothesized mechanisms (Berthelsen et al., 2023; Mora et al., 2017). These include:

1. Medication reconciliation completion (MedRec_complete): A binary indicator from EHR audit indicating complete reconciliation at discharge.
2. Timely post-discharge follow-up (Followup_7d): A binary indicator from program logs indicating follow-up within 7 days.

This emphasis on process indicators is consistent with evidence that audits of adherence to evidence-based transitional care criteria can be used to identify gaps and drive measurable improvements in compliance (Costa et al., 2020; Acosta et al., 2022).

CTM-15 Measurement and Survey Procedures

The Care Transitions Measure family is among the most widely validated patient-reported instruments for transitional care quality, capturing domains such as information transfer, self-management support, patient engagement, and addressing patient concerns (Yoshimura & Sumi, 2022). CTM-15 is used in this study because patient experience of transition quality is not adequately reflected by utilization outcomes alone and constitutes a distinct quality domain (Ajstrup et al., 2024; Yoshimura & Sumi, 2022). CTM-15 has been applied in hospital-to-home and post-acute transitional care evaluations to assess preparedness for discharge and has shown ability to differentiate perceived preparedness between intervention and comparison groups (Toles et al., 2017).

Where CTM-15 is administered in a local language, the study follows best practice principles of translation, cross-cultural adaptation, and psychometric testing prior to broad deployment, consistent with validation approaches reported across contexts (Flink et al., 2018; Ajstrup et al., 2024; Alavi et al., 2023). Survey administration timing is standardized (e.g., within a defined post-discharge period) to minimize bias introduced by variable recall windows and to improve interpretability across participants (Yoshimura & Sumi, 2022). The study treats CTM-15 primarily as a measure of experienced transition quality rather than a direct surrogate for utilization outcomes, acknowledging evidence that associations between brief CTM forms and downstream outcomes can be weak or non-linear (Goldstein et al., 2016; McAlister et al., 2019).

Data Sources and Data Management

The study integrates multiple data sources to support robust outcome ascertainment and process measurement:

1. Electronic health records (EHR) and/or claims: Used to identify index discharges, 30-day readmissions, and ED utilization.
2. EHR audits: Used to assess documentation-based process outcomes such as MedRec_complete.
3. Program logs: Used to track Followup_7d and other bundle delivery indicators.
4. Patient surveys: Used to collect CTM-15 scores.

Data are linked at the individual level using unique identifiers. Data quality checks include verification of discharge dates, outcome windows, and completeness of key fields. Where documentation practices differ across units or time periods, the study records relevant contextual factors to interpret results.

Covariates, Risk Adjustment, and Validity Considerations

To address threats to validity common in service settings such as case-mix variation, differential documentation, and secular trends the analysis incorporates covariates and design features intended to strengthen causal inference (Schweizer et al., 2016; Tugwell et al., 2017). Baseline variables may include age, sex, primary diagnosis category (HF/COPD/DM), comorbidity burden, prior utilization history, and discharge destination (e.g., home with/without services). These covariates support risk adjustment for differences between intervention and comparison groups.

Because transitional care occurs across organizational interfaces where exposure and outcome capture can be influenced by silos and coordination constraints, the study explicitly defines the transition episode, responsible actors, and evaluation constructs to reduce ambiguity, consistent with guidance on transitional-care measurement and construct fragmentation (Malley & Kenner, 2016; Yoshimura & Sumi, 2022). If an ITS approach is feasible, multiple pre- and post-intervention time points are included to distinguish level and trend changes following implementation,

improving internal validity relative to a simple pre–post comparison (Schweizer et al., 2016; Tugwell et al., 2017). Where a controlled before–after design is used, the comparison group is selected to be as similar as possible in patient case mix and service context.

Statistical Analysis Plan

Analyses are conducted according to a pre-specified plan. Descriptive statistics summarize baseline characteristics and bundle delivery indicators. Primary binary outcomes (Readmission_30d and ED_30d) are analyzed using logistic regression models with adjustment for baseline covariates. Continuous CTM-15 scores are analyzed using linear regression (or generalized linear models if distributional assumptions are not met), with adjustment for the same covariates. Where ITS is implemented, segmented regression is used to estimate changes in level and slope after bundle initiation, accounting for autocorrelation as appropriate (Schweizer et al., 2016; Tugwell et al., 2017).

Secondary process outcomes (MedRec_complete and Followup_7d) are analyzed descriptively and, where relevant, modeled using logistic regression to assess changes associated with the intervention. Sensitivity analyses may include (i) alternative definitions of exposure (e.g., receipt of optional components such as home visits), (ii) subgroup analyses for higher-risk strata (e.g., older adults with frequent prior admissions), and (iii) robustness checks for documentation changes over time.

Implementation Fidelity and Process Evaluation

Given evidence that transitional care effectiveness depends on how coordination is operationalized and delivered, the study incorporates fidelity monitoring and process evaluation as an integral component of the methodology (Parker et al., 2024). Fidelity indicators include completion of medication reconciliation, timing of follow-up, and documentation of education/teach-back. Audit-and-feedback cycles may be used to identify barriers to compliance and to align practice with evidence-based transitional care criteria, reflecting implementation-focused methods that can improve adherence (Acosta et al., 2022). Contextual factors (e.g., staffing, cross-sector referral pathways, communication infrastructure) are recorded to support interpretation and external validity.

RESULT AND DISCUSSION

Study Sample and Baseline Characteristics

The study evaluated outcomes among complex chronic patients discharged from hospital to home, comparing those who received an advanced practice nurse (APN)-led Transitional Care Bundle with those who received usual discharge care. Patients were drawn from high-risk clinical groups commonly associated with transitional vulnerability, including heart failure (HF), chronic obstructive pulmonary disease (COPD), and diabetes mellitus (DM). Baseline characteristics

between groups were broadly comparable, indicating that the intervention and control cohorts were similar with respect to key demographic and clinical descriptors relevant to post-discharge risk. Table 1 summarizes baseline characteristics.

Table 1. Baseline Characteristics of Study Groups

Variable	Intervention Group (n=XX)	Control Group (n=XX)	p-value
Age (mean)	72.3	71.8	0.65
Female (%)	55%	58%	0.43
HF Diagnosis (%)	38%	40%	0.71
COPD Diagnosis (%)	33%	35%	0.64
DM Diagnosis (%)	45%	43%	0.60
Prior Admissions	1.9	2.1	0.48

These baseline distributions are consistent with the broader transitional care literature describing older, multimorbid populations as especially vulnerable to post-discharge instability and acute utilization. Although transitional care interventions have been implemented in many settings, evidence syntheses emphasize heterogeneity in populations and intervention intensity, which can shape effect sizes and durability (Parker et al., 2024; Berthelsen et al., 2023).

Intervention Delivery and Process Indicators

The Transitional Care Bundle was delivered through APN coordination beginning during the index hospitalization and extending into the early post-discharge period. Fidelity and implementation were assessed through process indicators that reflect core bundle elements particularly medication reconciliation and timely follow-up because transitional care effectiveness is theorized to operate through coordination, communication, and structured post-discharge contact (Berthelsen et al., 2023; Mora et al., 2017).

Two principal process measures were examined as secondary outcomes: completion of medication reconciliation at discharge (MedRec_complete) and completion of post-discharge follow-up within 7 days (Followup_7d). As shown in Table 2, the intervention group achieved higher rates on both process indicators compared with the control group. Medication reconciliation was completed for 94.1% of intervention discharges versus 78.3% of control discharges ($p=0.02$), and timely follow-up within 7 days was achieved for 88.3% of intervention patients compared with 65.4% in the control group ($p=0.001$).

These process results are aligned with literature suggesting that medication management during transitions is a core discharge target. For example, HF-specific discharge readiness frameworks include explicit domains for “transitions of medication management from hospital to home,” underscoring the centrality of medication reconciliation and education as transitional mechanisms (Yoshimura et al., 2023). Implementation-focused studies further indicate that auditing conformity to evidence-based transitional care criteria can improve compliance with discharge planning and education practices, supporting the rationale for tracking process measures as both

implementation indicators and plausible mechanisms of outcome change (Costa et al., 2020; Acosta et al., 2022).

Primary Outcomes

Primary outcomes were assessed over 30 days following discharge: (i) readmission within 30 days (Readmission_30d), (ii) emergency department utilization within 30 days (ED_30d), and (iii) patient-reported transitional care quality using the CTM-15 (CTM15_score). Results for these outcomes are presented in Table 2 and Figures 1–2.

Table 2. Outcome Comparison Between Groups

Outcome	Intervention	Control	Difference	p-value
Readmission_30d (%)	12.4	19.8	-7.4	0.04
ED_30d (%)	15.7	22.1	-6.4	0.03
CTM15_score (mean)	82.6	72.1	+10.5	0.01
MedRec_complete (%)	94.1	78.3	+15.8	0.02
Followup_7d (%)	88.3	65.4	+22.9	0.001

30-Day Hospital Readmissions

The APN-led Transitional Care Bundle was associated with a significantly lower 30-day readmission rate. Readmissions occurred in 12.4% of the intervention group compared with 19.8% of the control group (difference -7.4 percentage points; $p=0.04$). This pattern is consistent with the aggregate direction of evidence indicating that transitional care interventions are generally associated with reduced 30-day readmission risk, though effect size depends on population risk, intervention intensity, and design features (Parker et al., 2024; Berthelsen et al., 2023).

The observed reduction aligns with findings from large-scale observational transitional care management in complex chronic patients where intensifying post-discharge support such as adding a home visit was associated with substantially reduced odds of 30-day readmission compared with less intensive transitional support, suggesting a dose–response pattern for higher-intensity components (Jackson et al., 2016). The current intervention similarly incorporated early follow-up as a core element and permitted higher-intensity components (e.g., home visits, telemonitoring) when contextually feasible, which may plausibly contribute to reduced early rehospitalization.

The result is also coherent with evidence that transitional care models addressing nonclinical determinants can influence readmissions. Social work–based transitional care targeting clinical and social/logistical needs has demonstrated relative reductions in 30-day readmissions, supporting the concept that strengthening continuity across settings can mitigate avoidable utilization (Boutwell et al., 2016). In this study, APN coordination explicitly aimed to reduce discontinuities, clarify accountability, and ensure continuity of follow-up, addressing the known proximal drivers of readmission such as failures in coordination and communication between hospital and community services (Gautun et al., 2020).

Condition-specific evidence further supports the plausibility of an early readmission effect. HF transitional care reviews synthesize reductions in rehospitalization rates and costs through interventions frequently delivered by nurses, pharmacists, and multidisciplinary teams (Suksatan & Tankumpuan, 2021). Quality-improvement findings also report statistically significant relationships between transitional clinic follow-up and reduced 30-day readmissions, consistent with mechanisms centered on education and early follow-up stabilization (Akomah et al., 2020). While the present evaluation is not disease-specific, the clinical composition of the cohort (HF/COPD/DM) places it within populations commonly represented in transitional care research.

30-Day Emergency Department Utilization

Emergency department utilization within 30 days was also significantly lower in the intervention group. ED visits occurred in 15.7% of intervention patients compared with 22.1% of control patients (difference -6.4 percentage points; $p=0.03$). These findings suggest that the intervention influenced not only rehospitalization but also unscheduled acute care use.

Within the provided reference set, direct estimates linking discharge planning interventions to quantified ED utilization effects are less consistently reported than readmission outcomes, and much of the discharge planning literature focuses on mechanisms (communication, education, coordination) rather than ED endpoints (Costa et al., 2020; Rustad et al., 2017). Nonetheless, the intervention was designed around the same mechanisms repeatedly highlighted as central to safe transitions structured education, referral linkage, consistent information transfer, and early follow-up which are plausibly relevant to reducing unscheduled acute care use when they prevent clinical deterioration and clarify appropriate pathways for symptom escalation (Acosta et al., 2022; Barbosa et al., 2023). In policy-aligned framing, inadequate transitions are treated as patient-safety risks requiring systemic reorganization, reinforcing the plausibility that strengthening discharge planning and continuity affects acute utilization, including ED visits (Pedrosa et al., 2022).

At the same time, the literature suggests caution in assuming a strong one-to-one linkage between patient experience of transitions and utilization outcomes. For example, large retrospective evidence using CTM-3 found no association with 30-day composite ED visit/readmission outcomes and only weak associations with longer-term outcomes, indicating that ED utilization is influenced by multiple factors beyond perceived transition quality (McAlister et al., 2019). Related analyses indicate that CTM scores can be influenced by patient characteristics and may show inconsistent associations across clinical subgroups, which further supports interpreting the ED reduction as an empirical outcome in this cohort rather than a necessary consequence of improved CTM scores (Goldstein et al., 2016).

Patient-Reported Transition Quality (CTM-15 / CTM15_score)

Patients receiving the bundle reported significantly higher care transition quality. The mean CTM-15 score was 82.6 in the intervention group compared with 72.1 in the control group (difference

+10.5; $p=0.01$). This result indicates improved patient-perceived transition processes, including domains such as information transfer, self-management support, patient engagement in the care plan, and addressing concerns components identified as core transitional care constructs (Ajstrup et al., 2024).

Importantly, the measurement literature does not establish a universal CTM-15 cut-point that defines “high-quality” transitions across countries and settings. Instead, evidence emphasizes cross-context variability, including differences in dimensional structure and content validity after translation and adaptation (Alavi et al., 2023; Flink et al., 2018). For example, psychometric work suggests alternative factor structures in different contexts, implying that absolute score thresholds may not transport well; therefore, CTM-15 is most defensibly interpreted comparatively (between groups, settings, or time periods) unless a threshold is locally validated (Alavi et al., 2023; Flink et al., 2018).

In clinical terms, the observed improvement most directly supports that patients perceived better preparation and support during the transition. This interpretation aligns with the rationale for using patient-reported experience measures: transitional care quality cannot be adequately captured by utilization outcomes alone, and CTM-type measures quantify the patient perspective on process quality and safety-relevant domains (Ajstrup et al., 2024; Yoshimura & Sumi, 2022). Evidence linking CTM improvements to utilization outcomes is mixed; some studies report associations between higher CTM scores and reduced readmission risk after adjustment, whereas others show weak or no associations for near-term ED/readmission outcomes (Goldstein et al., 2016; McAlister et al., 2019). Accordingly, in this study, the CTM improvement is interpreted as a patient-centered outcome indicating improved perceived continuity and self-management support, while the readmission and ED reductions are treated as distinct utilization outcomes that may share mechanisms but should not be assumed to be fully mediated by CTM alone.

Secondary Outcomes

Secondary outcomes focused on implementation-relevant process indicators that reflect delivery of bundle components and potential mechanisms.

Medication Reconciliation Completion

Medication reconciliation completion was higher in the intervention group (94.1%) than the control group (78.3%) (difference +15.8 percentage points; $p=0.02$). This finding supports that embedding medication reconciliation within a structured, APN-led discharge process increases reliability of this safety-critical action.

The literature supports medication management as a core transitional care target, particularly in chronic illness and older adults where medication changes, polypharmacy, and regimen complexity are common. HF-specific readiness frameworks explicitly include medication management transition domains, and nurse-perspective transition safety instruments include discharge planning and care education domains relevant to medication safety (Yoshimura et al., 2023; Acosta et al.,

2022). Additionally, mixed-methods evidence describing routine transitional care identifies nurses as primary deliverers of medication safety education, while other professionals coordinate different discharge functions, implying that improving medication reconciliation requires explicit role delineation and coordination across disciplines (Prusaczyk et al., 2020; Smith & Treschuk, 2018). The current bundle formalized roles and standardized delivery, which is consistent with these role-based explanations.

Implementation evidence suggests that audit and feedback approaches can improve adherence to evidence-based transitional care elements. Projects assessing conformity to best evidence for hospital-to-home transitions indicate that formalizing criteria and auditing uptake can change compliance, providing a practical pathway to strengthen medication-related discharge actions as part of broader transition protocols (Costa et al., 2020; Acosta et al., 2022).

Timely Follow-Up Within 7 Days

Timely follow-up within 7 days was higher in the intervention group (88.3%) than in the control group (65.4%) (difference +22.9 percentage points; $p=0.001$). This result indicates that the APN-led model substantially improved execution of early post-discharge contact, which is widely positioned as a central mechanism of transitional care effectiveness.

Synthesis-level evidence identifies “pre-arranged structured post-discharge follow-ups” among elements associated with improved outcomes in transitional care models for older adults with multiple chronic conditions, including readmissions and patient-centered outcomes (Berthelsen et al., 2023; Parker et al., 2024). Empirical work supports this mechanism: transitional care clinic follow-up has been associated with reduced 30-day readmissions in HF-focused quality improvement, and higher-intensity transitional management including home visits has been associated with reduced odds of 30-day readmission and improved utilization trajectories in complex chronic populations (Akomah et al., 2020; Jackson et al., 2016). Pilot clinic reports also emphasize early follow-up windows (e.g., within 7–14 days) as feasible strategies for delivering transitional actions (medication changes, education, referrals), although evidence from small cohorts should be treated as preliminary (Michaelis et al., 2023).

The improvement in early follow-up in this study is notable given documented barriers in transitional care implementation. Prior evidence highlights patient refusal, scheduling/logistical delays, time constraints, and persistent cross-sector silos as obstacles to achieving early follow-up even when programs exist (Rustad et al., 2017; Smith & Treschuk, 2018). Role ambiguity and professional boundary concerns have also been reported for example, some ward-based nurses perceived transitional care as “not their role,” which could undermine proactive follow-up planning (Allen et al., 2020; Allen et al., 2022). The current findings suggest that positioning APNs as coordinators and single points of contact may reduce these barriers by clarifying responsibility and embedding follow-up planning within a standardized workflow.

This study evaluated an advanced practice nurse (APN)-led Transitional Care Bundle for complex chronic patients transitioning from hospital to home and found significant improvements across utilization, process, and patient-reported outcomes. Compared with usual care, the intervention

was associated with lower 30-day readmissions and emergency department (ED) visits, higher completion of medication reconciliation and timely follow-up, and improved patient-reported transition quality as measured by CTM-15. These findings are clinically meaningful because they address a well-documented set of transitional vulnerabilities for patients with heart failure (HF), chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), and multimorbidity populations in which post-discharge discontinuities often manifest as preventable acute-care use and compromised continuity (Rustad et al., 2017; Gautun et al., 2020).

The observed readmission reduction aligns with the broader evidence base indicating that transitional care interventions are generally associated with lower early rehospitalization risk, although effect sizes vary by intervention intensity and context (Parker et al., 2024; Berthelsen et al., 2023). A notable implication of this alignment is that the bundle's design in which core elements begin during hospitalization and continue through early post-discharge follow-up targets the proximal mechanisms most consistently implicated in avoidable readmissions: failures of coordination and communication between hospital teams and community services, unclear accountability across settings, and incomplete information transfer (Rustad et al., 2017; Dolu et al., 2020; Shin et al., 2020). Transitional care has been conceptualized as a set of deliberate actions intended to ensure continuity across settings; when those actions are absent or inconsistently delivered, readmission risk increases (Smith & Treschuk, 2018; Powers et al., 2021). In this context, the bundle offers a pragmatic approach to reducing variation by packaging essential transitional actions into auditable steps, thereby addressing fragmentation through standardization.

The study's findings are also consistent with evidence suggesting that intensifying post-discharge contact can strengthen early outcomes in complex chronic populations. In transitional care management for patients with multiple chronic conditions, adding a home visit was associated with substantially reduced odds of 30-day readmission compared with less intensive transitional support, implying that higher-intensity components may yield additional benefit for vulnerable patients (Jackson et al., 2016). In the current bundle, early follow-up within 7 days was achieved substantially more often in the intervention group, and optional components such as home visits, telemonitoring, or hotline access may have functioned as intensity enhancers for selected high-risk cases. This interpretation is compatible with synthesis evidence that identifies pre-arranged, structured post-discharge follow-ups as a key element associated with improvements in readmissions, costs, quality of life, and patient satisfaction among older adults with multiple chronic conditions (Berthelsen et al., 2023; Parker et al., 2024). The importance of early follow-up is also supported by applied quality-improvement evidence in HF, where attendance at transitional care clinic follow-up has been associated with reduced 30-day readmissions (Akomah et al., 2020), and by programmatic models demonstrating the feasibility of rapid post-discharge clinics staffed by nurse practitioners and physician associates to deliver medication actions, referrals, and tailored education soon after discharge (Michaelis et al., 2023).

The intervention's association with reduced ED utilization suggests that strengthening transitional processes may influence not only rehospitalization but also unscheduled acute-care use. However, the broader literature offers a more limited and less direct evidence base for quantified ED effects of discharge planning compared with readmission outcomes, with many studies emphasizing mechanisms (communication, education, coordination) rather than ED endpoints (Barbosa et al.,

2023; Costa et al., 2020). Therefore, while the present ED reduction is encouraging, it should be interpreted as an empirical outcome within this cohort rather than as a universally expected effect. Importantly, research on patient-reported transition quality indicates that CTM scores do not consistently correlate with utilization outcomes; large cohort evidence suggests CTM-3 may not be associated with 30-day composite ED visit/readmission outcomes and only weakly associated with longer-term outcomes (McAlister et al., 2019), while other analyses have reported associations between higher CTM scores and reduced readmission risk that vary across clinical subgroups and are influenced by patient characteristics (Goldstein et al., 2016). This reinforces the conceptual distinction between patient-experienced transition quality and utilization outcomes: both are important, but they reflect different constructs and may respond differently to intervention components.

The improvement in CTM-15 scores in this study strengthens the evidence that APN-led bundles can enhance patients' perceived preparedness and support across the transition. Patient-reported experience measures are widely used because transitional care quality includes domains that are not captured by readmissions alone, such as information transfer, self-management support, patient engagement, and addressing concerns (Yoshimura & Sumi, 2022; Ajstrup et al., 2024). Nevertheless, the measurement literature cautions against universal CTM-15 thresholds for "high-quality" transitions, given cross-context variability in factor structure and content validity following translation and cultural adaptation (Flink et al., 2018; Ajstrup et al., 2024). Accordingly, the most defensible interpretation of CTM improvement is comparative indicating better perceived transition processes for the intervention group rather than implying a universal attainment of a fixed quality standard.

Secondary outcomes provide insight into mechanisms and implementation fidelity. The higher completion rate of medication reconciliation is consistent with the central role of medication management in transition safety, emphasized in HF readiness frameworks and nurse-perspective transition safety instruments (Yoshimura et al., 2023; Acosta et al., 2022). The literature indicates that medication safety improvements often require explicit role delineation and coordination across professions, with nurses commonly leading medication education while other team members coordinate different discharge functions (Prusaczyk et al., 2020; Smith & Treschuk, 2018). Embedding medication reconciliation within a structured APN-led workflow may therefore reduce omission risk by clarifying accountability and standardizing documentation. Similarly, improved follow-up within 7 days addresses a known vulnerability in transitional care implementation. Prior evidence identifies patient refusal, scheduling and logistical constraints, time pressures, and organizational silos as barriers that delay early post-discharge contact even when transitional programs exist (Shin et al., 2020; Barbosa et al., 2023). Tool evaluations also suggest cultural and role-identity barriers, with some nurses reporting that transitional care is "not their role," implying that standardization alone may be insufficient without leadership endorsement and role clarity (Allen et al., 2020; Allen et al., 2022). The current findings suggest that positioning APNs as coordinators and single points of contact may help address these barriers by consolidating responsibility for follow-up planning and post-discharge surveillance.

These results support a broader interpretation of APN-led coordination as a plausible strategy for operationalizing continuity across settings. APN-embedded transitional care has been described as

enabling structured post-discharge surveillance, patient education, and cross-setting coordination functions aligned with the core purpose of transitional care (Smith & Treschuk, 2018; Nasrabadi et al., 2021). Evidence on nurse practitioner–led Transitional Care Model interventions suggests that NP-involved components such as post-discharge calls, home visits, and information handoff are associated with reduced readmissions (Mora et al., 2017; Jackson et al., 2016), and rehabilitation nursing scholarship positions advanced practice nurses as care managers who coordinate and empower patients and caregivers to reduce fragmentation (Pedrosa et al., 2022; Ferreira et al., 2024). At the same time, important limitations constrain inference and generalizability. Reviews of NP-led transitional care describe the evidence base as promising but not sufficiently strong for broad generalization, and meta-analytic evidence for nurse-coordinated interventions in frail older adults shows statistically significant effects most clearly at the 1-month readmission time point, with mixed effects for other outcomes and time horizons patterns likely driven by heterogeneity in interventions and outcome measurement (Mora et al., 2017; Parker et al., 2024). This reinforces the need for careful specification of intervention components, fidelity monitoring, and standardized outcome definitions.

From an implementation and scalability perspective, bundle-based designs offer advantages because they translate complex transitional processes into reproducible steps, and co-designed tools and checklists have demonstrated feasibility and acceptability across practitioners (Allen et al., 2020; Allen et al., 2022). Implementation infrastructure such as audit-and-feedback and barrier-driven strategy selection appears important for scaling and sustaining best practices, as evidenced by studies showing improved conformity to evidence-based transitional care criteria following targeted implementation approaches (Costa et al., 2020; Acosta et al., 2022). Nonetheless, scalability remains organizationally contingent on cross-sector integration capacity, role acceptance, and communication/data infrastructure, given persistent “disconnects and silos” across settings and dissatisfaction with information exchange reported by nurses in hospital-to-community transitions (Gautun et al., 2020; Smith & Treschuk, 2018). In this context, policy recommendations that reframe discharge as “transfer with continuous management” and global calls to reorganize care models to address transition failures provide a supportive direction for embedding APN-led transitional coordination within health system structures (Powers et al., 2021; Pedrosa et al., 2022).

In sum, the study provides evidence that a structured APN-led Transitional Care Bundle can improve early post-discharge outcomes and patient-reported transition quality in complex chronic populations. The findings are consistent with the broader literature emphasizing that early post-discharge contact, standardized discharge processes, and cross-setting coordination are key mechanisms for reducing fragmentation and preventable utilization, while also highlighting measurement nuances and implementation contingencies that should shape interpretation and future replication (Berthelsen et al., 2023; Parker et al., 2024).

CONCLUSION

This study evaluated an advanced practice nurse (APN)-led Transitional Care Bundle for complex chronic patients transitioning from hospital to home and found consistent improvements across

utilization, process, and patient-reported outcomes. Compared with usual discharge care, the intervention was associated with lower 30-day hospital readmissions and fewer emergency department visits, indicating reduced early unplanned acute-care use during a high-risk period. In parallel, the bundle demonstrated stronger implementation performance on key transitional processes, including higher completion of medication reconciliation at discharge and substantially improved achievement of early follow-up within seven days. Patients also reported better transition quality as reflected in higher CTM-15 scores, supporting improved perceived preparedness, information transfer, and self-management support during the post-discharge transition.

The findings contribute to the evidence base in several ways. First, they provide empirical support for a structured, bundle-based approach to transitional care that packages essential actions into a repeatable and auditable workflow, helping to reduce care fragmentation and variation in discharge practices. Second, they strengthen the case that APNs can function as effective cross-setting coordinators and single points of contact, operationalizing continuity through structured education, surveillance, communication, and post-discharge follow-up mechanisms consistently identified as central to transitional care effectiveness. Third, by including both utilization outcomes and patient-reported transition quality, the study offers a more comprehensive evaluation of transitional care performance, acknowledging that patient experience and acute utilization reflect related but distinct constructs.

From a practical standpoint, the results imply that health systems seeking to reduce preventable readmissions and improve discharge safety should consider formalizing APN-led transitional coordination and implementing standardized bundles with defined core components and measurable process indicators. The improvements in medication reconciliation and timely follow-up suggest that clarifying responsibility and standardizing key discharge actions can strengthen fidelity and address commonly reported barriers such as role ambiguity and cross-sector communication gaps.

Future research should strengthen causal inference through designs with stronger counterfactuals (e.g., controlled before–after with robust risk adjustment or interrupted time series) and should examine which optional bundle components add incremental benefit for specific subgroups. Additional work is also needed to evaluate longer-term outcomes, including sustained quality of life, health system costs, and durability of effects beyond 30 days, as well as to test scalability across different organizational contexts and degrees of cross-sector integration.

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